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OFR 97-492: Flagstaff Quadrangle NURE HSSR Study

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[>> Pubs Warehouse](#) > [OF 97-492](#) > [State Coverage](#) > [Flagstaff Quadrangle](#)

National Geochemical Database—Reformatted Data from the National Uranium Resource Evaluation (NURE) Hydrogeochemical and Stream Sediment Reconnaissance (HSSR) Program

By Steven M. Smith
Version 1.40 (2006)

Totals of 977 sediment and 45 ground water samples were collected in the Flagstaff quadrangle (except from the Grand Canyon National Park, and the Hopi and Navajo-Hopi Indian Reservations) during April, November, and December of 1979 as part of the Savannah River Laboratory (SRL) Flagstaff Quadrangle



This page is currently being rewritten to the Version 1.41 format.

Brief History and Description of Data

[See [History of NURE HSSR Program](#) for a summary of the entire program.]

NURE Hydrogeochemical and Stream Sediment Reconnaissance (HSSR) study. These samples were analyzed by SRL for uranium and other elements (16 additional

elements in sediments and 9 in waters) and the analytical data were released in the [GJBX-137\(81\)](#) report (Note: Only partial data for the sediment samples were found in the data tapes). The water samples were then sent to the Oak Ridge Gaseous Diffusion Plant for "supplemental analyses." The supplemental analytical data, with results for 31 elements in waters, were not released in any quadrangle report for Flagstaff.

In 1982, SRL released a summary report and data files for 50 quadrangles in the Western United States. This report, [GJBX-132\(82\)](#), contains both the SRL analytical data for sediment and water samples and the supplemental analytical data for water samples from the Flagstaff quadrangle but the concentration values often differ slightly from those reported in the [GJBX-137\(81\)](#) quadrangle report. The introduction section of the [GJBX-132\(82\)](#) summary report states:

"The data in the present report may not be identical to those reported previously. This is due to the use of different "scrub" procedures for the preparation of the data for release. The differences should be minor."

SRL analyses of light hydrocarbons (methane, ethane, propane, and butane) in ground waters were released in the [GJBX-131\(82\)](#) summary report for 44 western quadrangles and 3 eastern quadrangles within the United States. This report includes data for 27 of the Flagstaff quadrangle ground water samples.

Data for gold analyses of sediments by SRL neutron activation were released in the [GJBX-135\(82\)](#) summary report. The introduction of that report states:

"This report contains previously unreported neutron-activation analyses of gold in sediment samples determined at SRL. These data were not included in the standard SRL NURE data reports because the gold spectrum was not measured in the original analytical procedure and the report format was designed without the gold analyses being included. Gold analyses became available as the analytical procedure was refined, but the report format was not modified to incorporate these data."

Only those sediment samples that had detectable concentrations of gold by neutron activation analysis were given in the [GJBX-135\(82\)](#) report. Sediment samples with

concentrations below detection limits were not reported and can only be ascertained by identifying which samples were actually analyzed by neutron activation at SRL.

The following is a general listing of all sample types collected and reported for NURE studies in the Flagstaff quadrangle. The actual number of records in the NEW-FORMAT NURE data files may be greater because of the multiple records needed to preserve all the data.

Summary of Flagstaff quadrangle sample types.

Sediment Sample Type	Number of Samples	Water Sample Type	Number of Samples
Wet Streams	2	Wells	21
Dry Streams	194	Springs	24
Soils	781		
Total Sediments	977	Total Waters	45

These Flagstaff quadrangle samples were analyzed by one or more of the following methods:

Sediment Samples

- **SR1:** Savannah River Neutron Activation Analysis - Neutron Counting of sediments for U.
- **SR2:** Savannah River Neutron Activation Analysis of sediments for Al, Ce, Dy, Eu, Fe, Hf, La, Lu, Mn, Na, Sc, Sm, Th, Ti, V, and Yb. (Note: Au values were reported later for this method.)

Water Samples

- **SR4:** Savannah River Neutron Activation Analysis - Neutron Counting of waters for U.
- **SR6:** Savannah River Neutron Activation Analysis of waters for Al, Br, Cl, Dy, F, Mg, Mn, Na, and V.
- **SR-HE:** Savannah River Helium Analysis of waters.
- **SR-GC:** Savannah River Gas Chromatography of waters for light hydrocarbons.
- **OR13:** Supplemental Analyses by Oak Ridge Emission Spectrochemical Analysis of waters for Ag, Al, B, Ba, Be, Ca, Ce, Co, Cr, Cu, Fe, K, Li, Mg, Mn, Mo, Na, Ni, P, Sc, Si, Sr, Ti, V, Y, Zn, and Zr. (Note: Nb and Th may be included in this method.)

- **OR17:** Supplemental Analyses by Oak Ridge Atomic Absorption Spectroscopy Analysis of waters for As and Se.
-

Composition of the NEW-FORMAT NURE Data Files

The data in the NEW-FORMAT NURE data files consist of records from all of the above reports. In order to reduce the number of records, a decision was made to primarily use the data from the [GJBX-132\(82\)](#) western U.S. summary report. The rationale for choosing this data set was that (1) it represents a later compilation of the data and (2) it should be more consistent across quadrangle boundaries because of the common "scrubbing procedure." Every record was checked against the "equivalent" record in the earlier [GJBX-137\(81\)](#) quadrangle report and any major differences were noted in the REFORMAT comment field. These slightly different but unused quadrangle report sediment records were saved as an extra file which may be accessed below.

In the water data file, the SRL analyses and supplemental analyses could NOT be combined because of overlapping determinations for 5 elements. Each water sample may therefore have 2 separate records - one for the SRL analysis and one for the supplemental analysis.

Hydrocarbon data from the [GJBX-131\(82\)](#) report were added to fields in the appropriate ground water records and this addition was noted for each record in the REFORMAT comment field.

Gold concentrations from the [GJBX-135\(82\)](#) report were added to the appropriate sediment records. A value of -0.01 (<0.01 ppm Au) was added to all other sediment samples determined to have been analyzed by SRL neutron activation. This value was chosen because 0.01 is the lowest reported gold concentration in the entire report.

Download The Data

The NURE HSSR data are now available online in two databases: The sediment database (also includes data for soils and some rocks) at <http://tin.er.usgs.gov/nure/sediment/> and the water database at <http://tin.er.usgs.gov/nure/water/>. From these two websites, NURE HSSR data can be selected, examined, summarized, and downloaded by political boundaries (State and County), by quadrangle (1:250,000-scale, 1:100,000-scale, and 1:63,360-scale for Alaska or 1:24,000-scale for the Lower 48 States), and by hydrologic unit (drainage region, subregion, river basin, or sub-basin). Selected data can be downloaded as a dBase file, a shapefile, an HTML table, or ASCII text (tab- or comma-delimited).

[Flagstaff Quadrangle Sediment Data](#) - 977 records

[Flagstaff Quadrangle Water Data](#) - 89 records



Unused set of quadrangle sediment records - *flagstsx.dbf.gz*

Notes for Data Users

Many records contain analytical values with insignificant digits. Most data should only have 2 or 3 significant digits and differences after the second or third digit should be ignored.

Other NURE Geochemical Data for the Flagstaff Quadrangle

A summary evaluation report was prepared for the Flagstaff quadrangle by the U.S. Geological Survey [[PGJ/F-014\(82\)](#)]. Additional samples of 216 rocks, 322 stream sediments and 209 waters were collected in the quadrangle to aid in the interpretation of uranium anomalies. The samples were analyzed and the multielement analytical data were released only as microfiche appendices accompanying the summary report.

Flagstaff Quadrangle NURE Bibliography

- Cook, J.R., and Fay, W.M., 1982, *Data report: Western United States*: E.I. du Pont de Nemours & Co., Savannah River Laboratory, Aiken, S.C., SRL Internal Doc. DPST-81-146-28, U.S. Department of Energy, Grand Junction, Colo., GJBX-132(82), 33 p.
- Dromgoole, E.L., 1982, *Report of analyses for light hydrocarbons in ground water*: E.I. du Pont de Nemours & Co., Savannah River Laboratory, Aiken, S.C., SRL Internal Doc. DPST-81-141-19, U.S. Department of Energy, Grand Junction, Colo., GJBX-131(82), 14 p.
- Fay, W.M., and Cook, J.R., 1982, *Gold analyses by neutron activation from SRL NURE samples*: E.I. du Pont de Nemours & Co., Savannah River Laboratory, Aiken, S.C., SRL Internal Doc. DPST-81-141-38, U.S. Department of Energy, Grand Junction, Colo., GJBX-135(82), 45 p.
- Thayer, P.A., and Cook, J.R., 1981, *Flagstaff 1° x 2° NTMS area, Arizona, data report (abbreviated)*: E.I. du Pont de Nemours & Co., Savannah River Laboratory, Aiken, S.C., SRL Internal Doc. DPST-81-146-17, U.S. Department of Energy, Grand Junction, Colo., GJBX-137(81), 16 p.
- Wenrich-Verbeek, K.J., Spirakis, C.S., Billingsley, G.H., Hereford, R., Nealey, L.D., Ulrich, G.E., Verbeek, E.R., and Wolfe, E.W., 1982, *National Uranium Resource Evaluation, Flagstaff quadrangle, Arizona*: U.S. Geological Survey, U.S. Department of Energy, Grand Junction, Colo., PGJ/F-014(82), 59 p.

Links Within Open-File Report 97-492

Back to [Arizona NURE data](#)

[Frequently Asked Questions Concerning NURE HSSR Data](#)

Home Page: [USGS National Geochemical Database - NURE HSSR data](#)

Page written by Steven M. Smith (smsmith@usgs.gov)

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[>> Pubs Warehouse](#) > [OF 97-492](#) > [State Coverage](#) > [Gallup Quadrangle](#)

National Geochemical Database—Reformatted Data from the National Uranium Resource Evaluation (NURE) Hydrogeochemical and Stream Sediment Reconnaissance (HSSR) Program

By Steven M. Smith
Version 1.40 (2006)

LASL: Gallup Quadrangle

Totals of 1,403 sediment and 516 water samples were collected from

Brief History and Description of Data

[See [History of NURE HSSR Program](#) for a summary of the entire program.]

1,856 locations within the Gallup quadrangle as part of the LASL Gallup Quadrangle NURE Hydrogeochemical and

Stream Sediment Reconnaissance (HSSR) study. Private subcontractors, under the direction of LASL, collected samples from the quadrangle during May - July of 1976, September of 1977, August - October of 1978, and October of 1979. Sediment samples were analyzed by LASL for uranium and up to 42 additional elements. Water samples were analyzed by LASL for uranium only. The analytical data were released as the LASL Gallup Quadrangle NURE HSSR study [GJBX-186\(80\)](#) report.

LASL: Grants Special Study

During October and November of 1979, LASL conducted a detailed geochemical survey of the Grants Uranium Mineral District within parts of the Albuquerque and Gallup quadrangles. Totals of 3,569 sediment and 167 water samples were collected from 2,601 locations within the study area. Of these, 1,981 sediment and 74 water samples were collected within the Gallup quadrangle. At 183 locations (111 in the Gallup quadrangle), specially collected sediment samples were sieved into 5 different size fractions to investigate the mineralogical distribution of uranium in sediments. The detailed survey sediment samples were analyzed by LASL for uranium and up to 42 additional elements. Water samples were analyzed by LASL for uranium only. The analytical data were released as the LASL Grants Special Study [GJBX-351\(81\)](#) report.

Summary Tables

The following is a list of sample types collected for all studies within the Gallup quadrangle study. This table includes each of the 5 multiple sieve fractions at 111 dry stream locations as found in the data.

Summary of Gallup quadrangle sample types.

Sediment Sample Type	Number of Samples	Water Sample Type	Number of Samples
Wet Streams	44	Streams	29
Dry Streams	2,648	Wells	462
Dry Streams (sieve splits)	565	Springs	99
Wet Springs	55		
Dry Springs	49		
Total Sediments	3,361	Total Waters	590

These Gallup quadrangle samples were analyzed by one or more of the following methods:

Sediment Samples

- **LA1:** Los Alamos Delayed-Neutron Counting Analysis of sediments for U.
- **LA2:** Los Alamos Energy Dispersive X-Ray Fluorescence Analysis of sediments for Ag, Bi, Cd, Cu, Nb, Ni, Pb, Sn, and W.
- **LA3:** Los Alamos Energy Dispersive X-Ray Fluorescence Analysis of sediments for Ag, As, Bi, Cd, Cu, Nb, Ni, Pb, Se, Sn, W, and Zr. (Special Study only).
- **LA4:** Los Alamos Arc-Source Emission Spectrography Analysis of sediments for Be and Li.
- **LA5:** Los Alamos Neutron Activation Analysis of sediments for Al, Au, Ba, Ca, Ce, Cl, Co, Cr, Cs, Dy, Eu, Fe, Hf, K, La, Lu, Mg, Mn, Na, Rb, Sb, Sc, Sm, Sr, Ta, Tb, Th, Ti, V, Yb, and Zn.

Water Samples

- **LA6-DN:** Los Alamos Delayed-Neutron Counting Analysis of waters for U.
- **LA6-FL:** Los Alamos Fluorometry Analysis of waters for U.

Discussion of the Reformatting Process for Gallup Quadrangle

The Gallup quadrangle sediment and water data consist of reformatted records from the Gallup Quadrangle NURE HSSR study [GJBX-186\(80\)](#) report plus reformatted records from the Gallup portion of the Grants Special Study [GJBX-351\(81\)](#) report. The following problems were found and addressed during the comparison, combining, and reformatting stages for the Gallup quadrangle data:

Sediment Records

1. During the NURE sample collection phase, LASL sites and samples were initially assigned a 6-digit integer Identification Number (LASLID) starting with 000001. After 1977, most LASL sites were reassigned a new 1-letter+5-digit Identification Number starting with A00001. All LASL samples and the early LASL reports use the 6-digit integer LASLID. Most of the later reports only use the 1-letter+5-digit LASLID. Although both sets of numbers were usually assigned sequentially, they do not correspond one to one with each other: 100001 does not equal C00001, etc. Whenever possible, the 1-letter+5-digit LASL Identification Number was saved in the LASLID field. When the corresponding 6-digit site number could be determined from sample number translation key lists or other sources, this Identification Number was saved in the SITE field.
2. A LASL Identification Number translation key was found for the Gallup quadrangle sediment samples. The 1-letter+5-digit LASL Identification Number was saved in the LASLID field and the corresponding 6-digit site number was manually added to the SITE field. Therefore, the LASLID field contains the Identification Number found in the LASL Gallup Quadrangle NURE HSSR study [GJBX-186\(80\)](#) report. The SITE field contains the corresponding LASL

- Identification Number used to label the original field maps, field notes, and sample containers.
3. No LASL Identification Number translation key was found for the Grants Special Study sediment samples. The 6-digit LASL Identification Number found in LASLID was also added to the SITE field. Therefore, the value found in the LASLID and SITE fields is same LASL Identification Number used to label the original field maps, field notes, and sample containers as well as the value published in the Grants Special Study [GJBX-351\(81\)](#) report.
 4. Several of the sediment samples from the Gallup Quadrangle NURE HSSR study [GJBX-186\(80\)](#) report were used and reported again in the Grants Special Study [GJBX-351\(81\)](#) report. Because there were no overlapping data fields, the corresponding records from the two reports were compared and combined into a single composite record for each sample. The 1-letter+5-digit LASL Identification Number found in the Gallup Quadrangle NURE HSSR study [GJBX-186\(80\)](#) report was added to the LASLID field, and the 6-digit LASL Identification Number from the Grants Special Study [GJBX-351\(81\)](#) report was placed in the SITE field.
 5. Seventeen sediment samples collected for the Gallup Quadrangle NURE HSSR study were apparently partially reanalyzed as part of the Grants Special Study. Because of overlapping data fields, it was necessary to create two data records (one with the Gallup Quadrangle analytical data and one with the Grants Special Study data) for each sample to preserve all the data. A comment in the REFORMAT field identifies each of these records.
 6. When combining corresponding sediment records from the Gallup Quadrangle NURE HSSR study [GJBX-186\(80\)](#) and Grants Special Study [GJBX-351\(81\)](#) reports, differences in latitude (LAT) and longitude (LONG) coordinates were found for 49 sediment samples. These differences appear to be due to corrections added to the later Gallup Quadrangle NURE HSSR study [GJBX-186\(80\)](#) report. Therefore when differences were found, the value from the Gallup Quadrangle NURE HSSR study [GJBX-186\(80\)](#) report was retained in the field and the differing value from the Grants Special Study [GJBX-351\(81\)](#) report was added as a comment to the COORDPRB field.
 7. Unlikely sample collection dates were found for twelve samples. These dates were removed from the SAMPDAT field. For each record, the original SAMPDAT value and the most likely correct value was added as a comment to the REFORMAT field.
 8. Two hundred and sixty-two sediment records with a STATE value of 'AZ' had coordinates that plotted in New Mexico. These STATE values were changed and a comment was added to the REFORMAT field for each record.
 9. Four sediment sample records contained values for the well pump type (WELLPUMP), well use (WELLUSE), or well diameter (WELLDIAM). These parameters were not normally recorded for sediment sample records. The values were removed from each record and added as a comment to the corresponding REFORMAT field.
 10. One stream-sediment sample has a longitude of exactly 108°W, the dividing line between the Gallup quadrangle and the Albuquerque quadrangle. This coordinate value was not changed but a comment was added to the COORDPRB field.
 11. Eighteen sediment samples in this quadrangle share the same latitude-longitude coordinates with one other sample (9 distinct coordinate sites). These appear to be sites collected during Gallup quadrangle study that were resampled during the Grants Special Study. A comment in the COORDPRB field identifies each of these pairs.

Water Records

1. A LASL Identification Number translation key was found for the Gallup quadrangle water samples. The 1-letter+5-digit LASL Identification Number was saved in the LASLID field and the corresponding 6-digit site number was manually added to the SITE field. Therefore, the LASLID field contains the Identification Number found in the LASL Gallup Quadrangle NURE

- HSSR study [GJBX-186\(80\)](#) report. The SITE field contains the corresponding LASL Identification Number used to label the original field maps, field notes, and sample containers.
2. No LASL Identification Number translation key was found for the Grants Special Study water samples. The 6-digit LASL Identification Number found in LASLID was also added to the SITE field. Therefore, the value found in the LASLID and SITE fields is same LASL Identification Number used to label the original field maps, field notes, and sample containers as well as the value published in the Grants Special Study [GJBX-351\(81\)](#) report.
 3. An unlikely sample collection date was found for one sample. This date was removed from the SAMPDAT field and the original SAMPDAT value with the most likely correct value was added as a comment to the REFORMAT field.
 4. Seventy-six water records with a STATE value of 'AZ' had coordinates that plotted in New Mexico. These STATE values were changed and a comment was added to the REFORMAT field for each record.
 5. Twenty-four water samples in this quadrangle share the same latitude-longitude coordinates with one other sample (12 distinct coordinate sites). These appear to be sites collected during Gallup quadrangle study that were resampled during the Grants Special Study. A comment in the COORDPRB field identifies each of these pairs.
-

Download The Data

The NURE HSSR data are now available online in two databases: The sediment database (also includes data for soils and some rocks) at <http://tin.er.usgs.gov/nure/sediment/> and the water database at <http://tin.er.usgs.gov/nure/water/>. From these two web sites, NURE HSSR data can be selected, examined, summarized, and downloaded by political boundaries (State and County), by quadrangle (1:250,000-scale, 1:100,000-scale, and 1:63,360-scale for Alaska or 1:24,000-scale for the Lower 48 States), and by hydrologic unit (drainage region, subregion, river basin, or sub-basin). Selected data can be downloaded as a dBase file, a shapefile, an HTML table, or ASCII text (tab- or comma-delimited).

[Gallup Quadrangle Sediment Data](#) - 3,378 records

[Gallup Quadrangle Water Data](#) - 590 records

Notes for Data Users

The data in the sediment database includes samples collected by 8 different methods

with respect to sieve sizes. (See the SAMPTYP coding explanation in the [On-Line Manual for USGS-Reformatted NURE HSSR Data Files](#) for descriptions of different Sample Types.) Analytical data may not be directly comparable for sediment samples collected by different methods.

Other NURE Geochemical Data for the Gallup Quadrangle

Gallup Quadrangle NURE Summary

A summary evaluation report was prepared for the Gallup quadrangle by the U.S. Geological Survey [[PGJ/F-013\(82\)](#)]. As part of this evaluation process, an additional 186 rock samples were collected and analyzed for uranium and up to 43 additional elements. These analytical data were released only as appendices on microfiche accompanying the summary report.

Gallup Quadrangle NURE Bibliography

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 - Purson, J.D., George, W.E., Hansel, J.M., Garcia, S.R., Hensley, W.K., and Mills, C. F., 1981, *Detailed uranium hydrogeochemical and stream sediment reconnaissance data release for the Grants special study area, New Mexico, including concentrations of forty-three additional elements*: Los Alamos Scientific Laboratory informal report LA-8480-MS, Los Alamos, N.M., U.S. Department of Energy, Grand Junction, Colo., GJBX-351(81), 311 p.
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Links Within Open-File Report 97-492

Back to [New Mexico NURE data](#)

Back to [Arizona NURE data](#)

[Frequently Asked Questions Concerning NURE HSSR Data](#)

Home Page: [USGS National Geochemical Database - NURE HSSR data](#)

Page written by Steven M. Smith (smsmith@usgs.gov)

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Page Last Modified: Mon May 22 17:22 EDT 2006





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OFR 97-492: Marble Canyon Quadrangle NURE HSSR Study

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National Geochemical Database—Reformatted Data from the National Uranium Resource Evaluation (NURE) Hydrogeochemical and Stream Sediment Reconnaissance (HSSR) Program

By Steven M. Smith
Version 1.40 (2006)

Totals of 885 sediment and 2 water samples were collected in the Marble Canyon quadrangle (except areas in Grand Canyon National Park, Glen Canyon National Recreation Area, and Hopi tribal lands) from May through November



This page is currently being rewritten to the Version 1.41 format.

Brief History and Description of Data

[See [History of NURE HSSR Program](#) for a summary of the entire program.]

of 1979 as part of the

Savannah River Laboratory (SRL) Marble Canyon Quadrangle NURE Hydrogeochemical and Stream Sediment Reconnaissance (HSSR) study. These samples were analyzed by SRL for uranium and other elements (16 additional elements in sediments and 9 in waters) and the analytical data were released in the Marble Canyon NURE HSSR

quadrangle [GJBX-138\(81\)](#) report. The water samples were then sent to other laboratories including Oak Ridge Gaseous Diffusion Plant for "supplemental analyses" of 23 elements in sediments and 31 elements in waters. SRL did not release the supplemental analytical data as a separate report.

In 1982, SRL released a summary report and data files for 50 quadrangles in the Western United States. This report, [GJBX-132\(82\)](#), contains both the SRL analytical data and the supplemental analytical data from the Marble Canyon quadrangle but the concentration values often differ from those reported in the [GJBX-138\(81\)](#) quadrangle report. The introduction section of the [GJBX-132\(82\)](#) summary report states:

"The data in the present report may not be identical to those reported previously. This is due to the use of different "scrub" procedures for the preparation of the data for release. The differences should be minor."

SRL analyses of light hydrocarbons (methane, ethane, propane, and butane) in ground waters were released in the [GJBX-131\(82\)](#) summary report for 44 western quadrangles and 3 eastern quadrangles within the United States. This report includes data for 1 of the Marble Canyon quadrangle ground water samples.

Data for gold analyses of sediments by SRL neutron activation were released in the [GJBX-135\(82\)](#) summary report. The introduction of that report states:

"This report contains previously unreported neutron-activation analyses of gold in sediment samples determined at SRL. These data were not included in the standard SRL NURE data reports because the gold spectrum was not measured in the original analytical procedure and the report format was designed without the gold analyses being included. Gold analyses became available as the analytical procedure was refined, but the report format was not modified to incorporate these data."

Only those sediment samples that had detectable concentrations of gold by neutron activation analysis were given in the [GJBX-135\(82\)](#) report. Sediment samples with concentrations below detection limits were not reported and can only be ascertained by identifying which samples were actually analyzed by neutron activation at SRL.

The following is a general listing of all sample types collected and reported for NURE studies in the Marble Canyon quadrangle. The actual number of records in the NEW-FORMAT NURE data files may be greater because of the multiple records needed to preserve all the data.

Summary of Marble Canyon quadrangle sample types.

Sediment Sample Type	Number of Samples	Water Sample Type	Number of Samples
Dry Streams	92	Wells	1
Soils	791	Springs	1
Talus	2		
Total Sediments	885	Total Waters	2

These Marble Canyon quadrangle samples were analyzed by one or more of the following methods:

Sediment Samples

- **SR1:** Savannah River Neutron Activation Analysis - Neutron Counting of sediments for U.
- **SR2:** Savannah River Neutron Activation Analysis of sediments for Al, Ce, Dy, Eu, Fe, Hf, La, Lu, Mn, Na, Sc, Sm, Th, Ti, V, and Yb. (Note: Au values were reported later for this method.)

Water Samples

- **SR4:** Savannah River Neutron Activation Analysis - Neutron Counting of waters for U.
- **SR6:** Savannah River Neutron Activation Analysis of waters for Al, Br, Cl, Dy, F, Mg, Mn, Na, and V.
- **SR-HE:** Savannah River Helium Analysis of waters.
- **SR-GC:** Savannah River Gas Chromatography of waters for light hydrocarbons.
- **OR13:** Supplemental Analyses by Oak Ridge Emission Spectrochemical Analysis of waters for Ag, Al, B, Ba, Be, Ca, Ce, Co, Cr, Cu, Fe, K, Li, Mg, Mn, Mo, Na, Ni, P, Sc, Si, Sr, Ti, V, Y, Zn, and Zr. (Note: Nb and Th may be included in this method.)
- **OR17:** Supplemental Analyses by Oak Ridge Atomic Absorption Spectroscopy Analysis of waters for As and Se.

Composition of the NEW-FORMAT NURE Data Files

The data in the NEW-FORMAT NURE data files consist of records from all of the above reports. In order to reduce the number of records, a decision was made to primarily use the data from the [GJBX-132\(82\)](#) western U.S. summary report. The rationale for choosing this data set was that (1) it represents a later compilation of the data and (2) it should be more consistent across quadrangle boundaries because of the common "scrubbing procedure." Every record in the sediment file was checked against the "equivalent" record in the earlier [GJBX-138\(81\)](#) quadrangle report and any major differences were noted in the REFORMAT comment field (no digital version of the quadrangle water data was released with the quadrangle report). These different but unused quadrangle report sediment records were combined and saved as an extra file which may be accessed below.

In the water data file the SRL analyses and supplemental analyses could NOT be combined because of overlapping determinations for 5 elements. Each water sample therefore has 2 separate records - one for the SRL analysis and one for the supplemental analysis.

Hydrocarbon data from the [GJBX-131\(82\)](#) report were added to fields in the appropriate ground water records and this addition was noted for each record in the REFORMAT comment field.

Gold concentrations from the [GJBX-135\(82\)](#) report were added to the appropriate sediment records. A value of -0.01 (<0.01 ppm Au) was added to all other sediment samples determined to have been analyzed by SRL neutron activation. This value was chosen because 0.01 is the lowest reported gold concentration in the entire report.

Download The Data

The NURE HSSR data are now available online in two databases: The sediment database (also includes data for soils and some rocks) at <http://tin.er.usgs.gov/nure/sediment/> and the water database at <http://tin.er.usgs.gov/nure/water/>. From these two websites, NURE HSSR data can be selected, examined, summarized, and downloaded by political boundaries (State and County), by quadrangle (1:250,000-scale, 1:100,000-scale, and 1:63,360-scale for Alaska or 1:24,000-scale for the Lower 48 States), and by hydrologic unit (drainage region, subregion, river basin, or sub-basin). Selected data can be downloaded as a dBase file, a shapefile, an HTML table, or ASCII text (tab- or comma-delimited).

[Marble Canyon Quadrangle Sediment Data](#) - 885 records

[Marble Canyon Quadrangle Water Data](#) - 4 records



Unused set of quadrangle sediment records - *marblesx.dbf.gz*

Notes for Data Users

Many records contain analytical values with insignificant digits. Most data should only have 2 or 3 significant digits and differences after the second or third digit should be ignored.

Other NURE Geochemical Data for the Marble Canyon Quadrangle

A summary evaluation report was prepared for the Marble Canyon quadrangle by the Bendix Field Engineering Corporation of Grand Junction, Colorado [[PGJ/F-022\(82\)](#)]. Additional samples of 170 rocks, and 100 waters were collected in the quadrangle to "identify environments and delineate areas favorable for the occurrence of uranium deposits." All samples were analyzed for uranium oxide, the water samples were analyzed for 5 elements, 133 of the rock samples were analyzed for 35 elements, and

23 of the rock samples were analyzed for eK, eU, and eTh. These data were released only as microfiche appendices accompanying the summary report.

Marble Canyon Quadrangle NURE Bibliography

- Cook, J.R., and Fay, W.M., 1982, *Data report: Western United States*: E.I. du Pont de Nemours & Co., Savannah River Laboratory, Aiken, S.C., SRL Internal Doc. DPST-81-146-28, U.S. Department of Energy, Grand Junction, Colo., GJBX-132(82), 33 p.
 - Dromgoole, E.L., 1982, *Report of analyses for light hydrocarbons in ground water*: E.I. du Pont de Nemours & Co., Savannah River Laboratory, Aiken, S.C., SRL Internal Doc. DPST-81-141-19, U.S. Department of Energy, Grand Junction, Colo., GJBX-131(82), 14 p.
 - Fay, W.M., and Cook, J.R., 1982, *Gold analyses by neutron activation from SRL NURE samples*: E.I. du Pont de Nemours & Co., Savannah River Laboratory, Aiken, S.C., SRL Internal Doc. DPST-81-141-38, U.S. Department of Energy, Grand Junction, Colo., GJBX-135(82), 45 p.
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Links Within Open-File Report 97-492

Back to [Arizona NURE data](#)

Back to [Utah NURE data](#)

[Frequently Asked Questions Concerning NURE HSSR Data](#)

Home Page: [USGS National Geochemical Database - NURE HSSR data](#)

Page written by Andrew W. Holt and Steven M. Smith

Contact: Steven M. Smith (smsmith@usgs.gov)

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OFR 97-492: Shiprock Quadrangle NURE HSSR Study

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National Geochemical Database—Reformatted Data from the National Uranium Resource Evaluation (NURE) Hydrogeochemical and Stream Sediment Reconnaissance (HSSR) Program

By Steven M. Smith
Version 1.40 (2006)

LASL: Shiprock Quadrangle

Totals of 1,676 sediment and 372 water samples were collected from

Brief History and Description of Data

[See [History of NURE HSSR Program](#) for a summary of the entire program.]

1,999 locations within the Shiprock quadrangle during September 1977 (easternmost eighth of the quadrangle and the

Ute Mountain Indian Reservation) and between August and October of 1978 (Navajo Reservation). These samples were collected by private contractors under the direction of the Los Alamos Scientific Laboratory (LASL). Sediment samples were analyzed by LASL for uranium and up to 42 additional elements. Water samples were analyzed by LASL for uranium only. The analytical data were released in the Shiprock Quadrangle NURE Hydrogeochemical and Stream Sediment Reconnaissance (HSSR) study [GJBX-](#)

[143\(80\)](#) report.

The following is a list of sample types collected for the Shiprock quadrangle study.

Summary of Shiprock quadrangle sample types.

Sediment Sample Type	Number of Samples	Water Sample Type	Number of Samples
Wet Streams	18	Streams	21
Dry Streams	1,585	Wells	306
Wet Springs	34	Springs	45
Dry Springs	39		
Total Sediments	1,676	Total Waters	372

These Shiprock quadrangle samples were analyzed by one or more of the following methods:

Sediment Samples

- **LA1:** Los Alamos Delayed-Neutron Counting Analysis of sediments for U.
- **LA2:** Los Alamos Energy Dispersive X-Ray Fluorescence Analysis of sediments for Ag, Bi, Cd, Cu, Nb, Ni, Pb, Sn, and W.
- **LA4:** Los Alamos Arc-Source Emission Spectrography Analysis of sediments for Be and Li.
- **LA5:** Los Alamos Neutron Activation Analysis of sediments for Al, Au, Ba, Ca, Ce, Cl, Co, Cr, Cs, Dy, Eu, Fe, Hf, K, La, Lu, Mg, Mn, Na, Rb, Sb, Sc, Sm, Sr, Ta, Tb, Th, Ti, V, Yb, and Zn.

Water Samples

- **LA6-DN:** Los Alamos Delayed-Neutron Counting Analysis of waters for U.
- **LA6-FL:** Los Alamos Fluorometry Analysis of waters for U.

Discussion of the Reformatting Process for Shiprock Quadrangle

The Shiprock quadrangle sediment and water data consist of reformatted records from the Shiprock Quadrangle NURE HSSR study [GJBX-143\(80\)](#) report. The following

problems were found and addressed during the comparison and reformatting stages for the Shiprock quadrangle data:

Sediment Records

1. During the NURE sample collection phase, LASL sites and samples were initially assigned a 6-digit integer Identification Number (LASLID) starting with 000001. After 1977, most LASL sites were reassigned a new 1-letter+5-digit Identification Number starting with A00001. All LASL samples and the early LASL reports use the 6-digit integer LASLID. Most of the later reports only use the 1-letter+5-digit LASLID. Although both sets of numbers were usually assigned sequentially, they do not correspond one to one with each other: 100001 does not equal C00001, etc. Whenever possible, the 1-letter+5-digit LASL Identification Number was saved in the LASLID field. When the corresponding 6-digit site number could be determined from sample number translation key lists or other sources, this Identification Number was saved in the SITE field.
2. A LASL Identification Number translation key was found for the Shiprock quadrangle sediment samples. The 1-letter+5-digit LASL Identification Number was saved in the LASLID field and the corresponding 6-digit site number was manually added to the SITE field. Therefore, the LASLID field contains the Identification Number found in the Shiprock Quadrangle NURE HSSR study [GJBX-143\(80\)](#) report. The SITE field contains the corresponding LASL Identification Number used to label the original field maps, field notes, and sample containers.
3. Unlikely sample collection dates were found for four samples. These dates were removed from the SAMPDAT field. For each record, the original SAMPDAT value and the most likely correct value was added as a comment to the REFORMAT field.
4. Twenty-nine sediment records with a STATE value of 'AZ' had coordinates that plotted in New Mexico. These STATE values were changed and a comment was added to the REFORMAT field for each record.
5. One sample record contained an invalid value for the scintillometer measurement(SCIN) of -175. Although the most likely source of this error is an unwanted negative sign, this could not be confirmed in published sources. This value was removed from the SCIN field and added as a comment to the REFORMAT field.

Water Records

1. A LASL Identification Number translation key was found for the Shiprock quadrangle water samples. The 1-letter+5-digit LASL Identification Number was saved in the LASLID field and the corresponding 6-digit site number was manually added to the SITE field. Therefore, the LASLID field contains the Identification Number found in the Shiprock Quadrangle NURE HSSR study [GJBX-143\(80\)](#) report. The SITE field contains the corresponding LASL Identification Number used to label the original field maps, field notes, and sample containers.
2. Unlikely sample collection dates were found for two samples. These dates were removed from the SAMPDAT field. For each record, the original SAMPDAT value and the most likely correct value was added as a comment to the REFORMAT field.
3. Seven water records with a STATE value of 'AZ' had coordinates that plotted in New Mexico. These STATE values were changed and a comment was added to the REFORMAT field for each record.

Download The Data

The NURE HSSR data are now available online in two databases: The sediment database (also includes data for soils and some rocks) at <http://tin.er.usgs.gov/nure/sediment/> and the water database at <http://tin.er.usgs.gov/nure/water/>. From these two web sites, NURE HSSR data can be selected, examined, summarized, and downloaded by political boundaries (State and County), by quadrangle (1:250,000-scale, 1:100,000-scale, and 1:63,360-scale for Alaska or 1:24,000-scale for the Lower 48 States), and by hydrologic unit (drainage region, subregion, river basin, or sub-basin). Selected data can be downloaded as a dBase file, a shapefile, an HTML table, or ASCII text (tab- or comma-delimited).

[Shiprock Quadrangle Sediment Data](#) - 1,676 records

[Shiprock Quadrangle Water Data](#) - 372 records

Notes for Data Users

None at this time.

Other NURE Geochemical Data for the Shiprock Quadrangle

Shiprock Quadrangle NURE Summary

A summary evaluation report was prepared for the Shiprock quadrangle by the U.S. Geological Survey [[PGJ/F-024\(82\)](#)]. An additional 127 rock, 1,627 sediment, and 380 water samples were collected from all parts of the quadrangle except for the Permian Cutler Formation. The samples were analyzed and the multielement analytical data were released only as appendices on microfiche accompanying the summary report.

Shiprock Quadrangle NURE Bibliography

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Links Within Open-File Report 97-492

Back to [Arizona NURE data](#)

Back to [New Mexico NURE data](#)

Back to [Colorado NURE data](#)

Back to [Utah NURE data](#)

[Frequently Asked Questions Concerning NURE HSSR Data](#)

Home Page: [USGS National Geochemical Database - NURE HSSR data](#)

Page written by Steven M. Smith (smsmith@usgs.gov)

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